

CLAIMS

What is claimed is:

1. An evaporative emission control and leak detection system for a motor vehicle, the system in fluid communication with emissions from a fuel tank, an engine and a carbon canister, the system comprising:

an integrated valve module in fluid communication with the carbon canister and the atmosphere, and arranged to vent the system when exposed to predetermined high negative and positive pressure conditions, and a predetermined low negative pressure condition, the module including a switch operable to indicate when the system is in a high or low negative pressure condition.

2. The system of claim 1, wherein the integrated valve module further comprises:
a one-way low negative pressure valve;
a one-way high negative pressure valve, wherein the low and high negative pressure valves are coupled in parallel to a fluid passage between the carbon canister and the atmosphere; and

a one-way high positive pressure valve coupled to a flow passage between the carbon canister and the atmosphere that bypasses the low negative pressure and high negative pressure valves.

3. The system of claim 2, wherein the low negative pressure one-way valve includes a gravity-biased valve member and is arranged to provide low negative pressure system relief and low level system leak test verification, the low negative pressure valve biased to a closed position unless a negative pressure exceeding a predetermined low negative pressure threshold is present in the system.

4. The system of claim 2, wherein the module further comprises a chamber in parallel fluid communication with the low negative and high negative pressure valves and the atmosphere, and wherein the switch is positioned within the chamber.

5. The system of claim 4, wherein the switch comprises a diaphragm member coupled to a biasing member and an electrical connector, the switch arranged to overcome the biasing member and contact the electrical connector upon being exposed to a negative pressure condition sufficient to open the low pressure valve.

6. The system of claim 2, wherein the high negative pressure one-way valve includes a gravity biased valve member and is arranged to provide high negative system pressure relief and regulation, the high negative pressure valve biased to a closed position unless a negative pressure exceeding a predetermined high negative pressure threshold is present in the system.

7. The system of claim 2, wherein the high positive pressure one-way valve includes a gravity-biased valve member and is arranged to provide high positive pressure system relief, the high positive pressure valve biased to a closed position unless a positive pressure exceeding a predetermined high positive pressure threshold is present in the system.

8. The system of claim 2, wherein the high positive pressure one-way valve is further arranged to provide pressure relief for the system during refueling of the fuel tank.

9. The system of claim 2, wherein the low and high negative pressure valves and the high positive pressure valve are positioned in the integrated valve module in a stacked arrangement along a common axis of translation.

10. The system of claim 1, wherein the carbon canister is coupled to the integrity module.